

Part (B)- SEWERAGE AND SANITATION PART OF THE PROJECT.

TECHNICAL REPORT

Name of work:- Development of Nallah Mar Area.
Authority :- Orders of the Chief Minister, J&K State.
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INTRODUCTION:

Nallah Mar takes off from the back waters of Dal Lake called Babadamb at Andh Masjid Khanyar. Traversing through the heart of city i.e. Naid Kadal, Bohri Kadal, Saraf Kadal, Kadi Kadal, Rajouri Kadal, Kawadara, Ranger Kadal, Gumb Kadal, Beri Kadal, Sekidafar, Waniyar etc. it ultimately discharges into the River Jhelum at Church-i-Faqir. A branch of Nallah which takes off at Kawadara, discharges into Khushalsar, thus linking Dal Lake with Anchar Lake on one side and with River Jhelum on the other.

PROBLEM:

The Nallah when alive served three-fold purposes to Srinagar City:-

- a) Navigation,
- b) Irrigation, &
- c) Drainage.

The Nallah has choked now and has not only lost its utility but has become a health hazard of formidable proportions in the shape of an open repository of filths offensive odours, abnoxious smell and pollution of every kind imaginable.

PROPOSAL:

Various solutions for re-activation of Nallah Mar to its original position were discussed in high level meetings and it was ultimately decided to fill up the nallah to cover it into an avenue with a sewer underneath.

DETAILS OF THE PROPOSAL:

Construction of Approach Road:

It has been proposed to construct the four approach roads to Nallah Mar.

1. From Khanyar to Andh Masjid (at head).
2. From New Chattabal Bridge to Noorbagh Waniyar at tail
3. From Gojwara to Rajouri Kadal, &
4. From Nawab Bazar to Kawadara.

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These approaches would help in cartage of materials to Nallah side during execution of work and link up the rest of city with the main road proposed over Nallah Mar after completion of Sewer construction. Initially the width of approaches will be 40' but latter on the approaches at head and tail i.e. from Khanwar to Andh Masjid and from New Chattabal Bridge to Noorbagh will be widened to 80'.

Construction of 500' long storm water drain along the approach road at head is necessary. Calculation in support of the size of storm water drain are attached at annexure II to this report.

CONSTRUCTION OF SEWER:

It is proposed to lay a trunk sewer along Nallah Mar starting from Andh Masjid to Noorbagh Waniyar. The part of the city which this sewer will serve is bounded by Dal Lake, Tsunti Khul, River Jhelum and Khushalsar in the East, South, West and North respectively and constitutes a distinct independent zone for Sewerage and sewage disposal. The present proposal would not, therefore, conflict or interfere with the scheme for Sewerage & Sewage ~~disposal of the City as a whole~~ disposal of the City as a whole. In the proposed Sewerage Scheme, Srinagar City has been divided into three Zones i.e. Zone 1, Zone 2, and Zone No: 3. This portion of Srinagar (from Dalgate to Waniyar) forms Zone No: 3 in the above mentioned scheme.

FLUSHING CHAMBER:

The calculated R.L.S. of the inverts of laterals & mains discharging into the Trunk sewer at various points necessitate adopting 5190.00 as R.L. of the Trunk Sewer invert at its start i.e. Andh Masjid. This is two ft. lower than the lowest water level of Babadamb which has been observed as 5192.00 at Andh Masjid for the last two years. To take the advantage of the higher water level of Babadamb, it is proposed to utilize it for gravity flushing of Trunk Sewer.

A 24" dia sluice valve will be fitted in the flushing chamber. Flushing will be effected as and when necessary for operating the sluice valve.

3. TRUNK SEWER:

~~Discharge~~ Discharge:-

Discharge from various localities has been worked out on area basis taking population density of 150 souls per Mohalla-wise acre. Population figures of Srinagar City is not available. Population figures of certain localities were collected from the office of the Food and Supplies Commissioner, Srinagar. To compare the population figures arrived at on area basis with actual population Rainawari area has been taken as a test case. The population of Rainawari area as per figures obtained from the Food and Supplies Deptt. (borne before 1968) is about 17,800 souls. Taking growth rate of 1.75% the population after 30 years would be 27,000 souls. The population of Rainawari works out 26,000 souls which more or less correspondance with the above figures.

ii. RATE OF SEWAGE:

The percapita rate of sewage has been assumed 40 gallons per day including the ground water infiltration as previously discussed with and approved by the Advisor to Ministry of Health, Government of India.

iii. PEAKING FACTOR:

Peaking factor has been taken as under:

<u>Contributing population.</u>	<u>Peaking factor.</u>
upto 50,000 souls.	3.0 times.
from 50,000 to 2,00,000	2.5 times.

Sewer from 6"-15" diameter have been designed to run 1/2 full with peak flow. Sewers from 18" - 36" dia have been designed to run 2/3rd full for the peak flow.

Sewers greater than 36" dia have been designed to run 3/4th full for peak flow.

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iv. Kutters formula has been adopted for computing the flow. In view of the rough finish of pipes available here value of N has been taken .015 for all sizes.

v. Velocity of flow:- Trunk sewer has been designed for minimum self cleansing velocity of 2.75 ft. per sec: for the peak flow. The velocity with Dry weather flow varies from 2.47 to 3.00 ft. per sec: The size of trunk sewer works out as under:-

From R.D. 0 to R.D. 1250	36" dia	= 1250 Rft.
From R.D. 1250 to RD 3280	39" dia	= 2030 Rft.
From R.D. 3280 to RD 8600	42" dia	= 5320 Rft.
From R.D. 8600 to RD 13000	45" dia	= 4400 Rft.

Calculation in support of sewer sizes is attached as appendix (III) to this note.

vi. SEWER CONSTRUCTION:

Since the bed of Nallah Mar is slushy, two ftl deep stone filling with 25% cement concrete grouting 1:4:8 for one ft. depth will be done after excavation of the Sewer trench to proper depth and grade. Reinforced precast cement concrete pipes will be laid. These will be jacketted with $4\frac{1}{2}$ " thick cement concrete of 1:2:4 mix around with nominal reinforcement.

vii. MANHOLES:

Manholes have been proposed along Trunk Sewer 200 ft or more apart depending on the size of sewer. 4 ft. dia, brick masonry manholes have been proposed. These will be reduced to 2 ft. at top by corbelling of the bricks. The foundation will consist of 2' deep stone filling with a 6" thick Raft over it. The bearing capacity of the soil has been assumed as .30 tons per sft. as against 0.32 tons per sft. actual bearing capacity found out by tests conducted by the Irrigation Research Laboratory Srinagar. Ventilating shafts will be provided over each manhole. Calculations in support of raft thickness are attached

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as Annexure (IV) to this report.

C. LAYING OF TEMPORARY C.I. PIPE LINE:

The Nallah Mar is the receiptant of all waste water of its adjoining areas. Till completion of sewer and storm water drain, disposal of the waste water is essential. For this purpose it is proposed to lay a temporary C.I. pipe line of 6" dia. The waste water and also the discharges from dewatering pumps will be carried through these temporary mains.

d. Pump House:- The depth of cutting of sewer exceeds 20' at Noorbagh, it is proposed to install a Booster Station below Noorbagh at R.D. 13000 i.e. about 2000' ahead of proposed site for Treatment Plant. For the present the sewage will be discharged into River Jhelum which is about 1000 ft. away from this proposed site. After completion of Treatment Plant, the Booster station will consist of a Wet Well and a Dry Well with a roof over dry well. The wet well has been designed for a retention capacity of 12.5 minutes during D.W.F. and for 5 minutes retention capacity per peak flow. Booster pumps will be housed in the dry well to achieve a negative suction. It will be provided with proper super-structure for housing the machinery and power control units.

~~As per calculations attached to this report forming Annexure (VII) Horse power of the pumps required to deal with the incoming sewage after completion of scheme works out as under:-~~

e. PUMPING MACHINERY:

As per calculations attached to this report forming annexure (VII) Horse power of the pumps required to deal with the incoming sewage after completion of scheme works out as under:-

H.P. of motor to deal with D.W.F.	115 HP
H.P. of motor to deal with 2 D.W.F.	230 HP
H.P. of motor to deal with peak flow	290 HP

Since it will take about a decade by which time we expect full discharge to reach the Booster Station, it is recommended to install two motors with pumps of 35 H.P. and 115 H.P. for the present.

f. CONSTRUCTION OF BUILDINGS:

For efficient managements and proper supervision of works it is necessary to locate the offices of the Executive staff near the site of work. The following structures are proposed:-

1) Store Building:- Lot of Depttl. materials are to be supplied for execution of this project. For this purpose a store building which is a must is proposed at Andh Masjid.

2) Sub Divisional Office:- Construction of Sub-Divisional office at Andh Masjid is proposed and it is necessary for speedy execution and proper supervision of work.

3) Divisional Office building:- Construction of Divisional office building is also necessary in view of shortage of office accommodation. Calculations in support of the design of building forms annexure (VIII) to this report.

g. CONSTRUCTION OF ROAD:

1) Earthwork filling:- For construction of road filling of earth over sewer is necessary. After lay of sewer mains Nallah will be filled with earth. The earth can be obtained from the Flood Supplementary Channel.

2) Construction of Road:- After completion of earth filling an ^{66'} wide road will be constructed. It will consist of dual carriage way of ^{22'} ~~22'~~ wide divided by Central strip of ^{4'} ~~4'~~ width (underneath which the sewer will be aligned) with side walks of ^{8'} ~~4'~~ width on either side.

The carriage way will have foundation of 9" thick stone soling, base course of 6" thick ring metal with a wearing course of 1" thick premix over it. It will be provided with precast Semi Circular R.C.C. surface drains on either side. The central strip of 4' width will be turfed. The side walks will be finished with 1" thick premix over 6" thick ring metal Rough Chesil dressed Dewri Kerb stone of 9"x6" size will be laid on either side of carriage ways along surface drains.

The cost of the above items of work as per General abstract of cost forming Annexure I to this report is Rs. 184-00 lacs.

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ABSTRACT OF COST.

(Part (B)- Sewerage and Sanitation part of the
Nallah Mar Development Project). *(As per operational Plan)*

Sl. No.		Particulars.	Amount.
1.		Compensation.	Rs 34-00 lacs
2.		Trunk sewer and other appurtenant works.	Rs 66-00 lacs
3.		Treatment plant.	Rs 21-72 lacs
4.		Storm water drains.	Rs 10-53 lacs
5.		Sewer Sub mains.	Rs 17-17 lacs
6.		Main road including filling.	Rs 19-64 lacs
7.		Approach roads construction.	Rs 13-08 lacs
8.		Construction of Buildings.	Rs 1-86 lacs
Total sewerage and sanitation part:-			Rs 184-00 lacs

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